REMARKS

Applicants appreciate the Examiner's thorough examination of the present application as evidenced by the Office Action of May 31, 2006 (hereinafter "Office Action"). In response, Applicants have amended independent Claims 1 and 25 to clarify that a capacitor is disposed on an upper surface of the TiN contact plug opposite the substrate/lower conductive layer. Applicants respectfully submit that the cited references fail to disclose or suggest all of the recitations of the pending independent claims, as amended. Accordingly, Applicants submit that all pending claims are in condition for allowance. Favorable reconsideration of all pending claims is respectfully requested for at least the reasons discussed hereafter.

Suspension of Action

In Applicants' Request for Continued Examination filed April 26, 2006, Applicants submitted a request for a three-month Suspension of Action under 35 C.F.R. §1.103(c) along with the required fee. Thus, any Office Action issued in the present case should have been delayed until at least July 26, 2006. The present Office Action, however, was mailed May 31, 2006. Applicants respectfully request that if the application is not allowed in response to the present amendment, then any subsequent Office Action not be made final as Applicants were not given three-months in which to file a preliminary amendment before the present Office Action was mailed.

Independent Claims 1 and 25 are Patentable

Independent Claim 1 stands rejected under 35 U.S.C. §102(b) as being anticipated by U. S. Patent No. 5,672,543 to Chang *et al.* (hereinafter "Chang"). (Office Action, page 2). Independent Claim 25 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Chang in view of U. S. Patent No. 6,404,058 to Taguwa (hereinafter "Taguwa") and further in view of U. S. Patent No. 6,534,809 to Moise (hereinafter "Moise"). (Office Action, page 4).

Independent Claim 1 is directed to an integrated circuit device and recites, in part:

> a substrate;
> an insulating layer disposed on the substrate having a gap formed therein;
> a TiN liner layer that exhibits compressive stress characteristics disposed on sidewalls of the insulating layer, which define the gap, and on the substrate in the gap;

a TiN contact plug that exhibits tensile stress characteristics disposed directly on the TiN liner layer; and

a capacitor disposed on an upper surface of the TiN contact plug opposite the substrate and comprising a lower electrode that contacts an upper surface of the TiN contact plug and an upper surface of the TiN liner layer.

Similarly, Claim 25 is directed to a contact plug of a semiconductor device and recites, in part:

a TiN plug having an upper surface contacting the upper conductive layer and having tensile stress;

a TiN liner contacting the TiN plug so as to surround the TiN plug along the side wall and the bottom of the TiN plug and having compressive stress; and

an ohmic layer contacting the TiN liner on the opposite side of the TiN plug and located between the TiN liner and the insulating film and between the TiN liner and the lower conductive layer;

wherein the capacitor is disposed on an upper surface of the TiN plug opposite the lower conductive layer and comprising a lower electrode that contacts an upper surface of the TiN contact plug and an upper surface of the TiN liner.

Thus, both Claims 1 and 25 recite that a capacitor is disposed on the TiN plug and contacts both an upper surface of the contact plug and an upper surface of the TiN liner. FIG. 2 of the Specification of the present application illustrates exemplary embodiments of the present invention in which a capacitor is disposed on the upper surface of the TiN plug.

Turning first to the rejection of Claim 1 under 35 U.S.C. §102(b), Chang does not disclose or suggest the use of a TiN plug, but instead describes the contact plug as being a tungsten plug (Chang, FIG. 8, tungsten plug 28). Moreover, Chang does not include any disclosure or suggestion with respect to the formation of a capacitor on an upper surface of a contact plug. Accordingly, Applicants respectfully submit that independent Claim 1 is patentable over Chang and that dependent Claims 3 - 7, 13, and 14 are patentable at least per the patentability of Claim 1.

Turning next to independent Claim 25, the Office Action rejects this claim based on the combination of Chang, Taguwa, and Moise. As discussed above, Chang does not disclose or suggest the use of a TiN plug or a capacitor that contacts an upper surface of a TiN plug and a TiN liner. While Applicants acknowledge that Taguwa discloses a capacitor in combination with a contact plug in FIGS. 5A -5D, in sharp contrast with the recitations of independent Claim 25, the lower electrode of the capacitor and the contact plug are formed as a unitary component

55. That is, there is no upper surface of a contact plug on which the lower electrode of the capacitor is disposed. Moise, on the other hand, discloses a capacitor 125 that may be formed on a plug 114 or a barrier layer 122. (Moise, FIG. 1; col. 9, lines 227 - 30).

As affirmed by the Court of Appeals for the Federal Circuit in *In re Sang-su Lee*, a factual question of motivation is material to patentability, **and cannot be resolved on subjective belief and unknown authority**. *See In re Sang-su Lee*, 277 F.3d 1338 (Fed. Cir. 2002). It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher."

Applicants submit that the cited references provide no clear and particular motivation for combining their respective teachings. Chang, for example, is directed to methods of tungsten plug metallization (Chang, col. 1, lines 1 - 13), while Taguwa and Moise are not directed to the use of tungsten in forming contact plugs. Moreover, Taguwa describes the formation of a contact plug and lower electrode of a capacitor as a unitary component, while Moise describes forming the contact plug and lower electrode of a capacitor as separate elements as discussed above. Thus, the teachings of Taguwa and Moise are incompatible with respect to the formation of a contact plug and a lower electrode of a capacitor. It appears, therefore, that the Office Action gains its alleged impetus or suggestion to combine the cited references by hindsight reasoning informed by Appellants' disclosure, which, as noted above, is an inappropriate basis for combining references.

Accordingly, for at least the foregoing reasons, Applicants respectfully submit that independent Claim 25 is patentable over the cited references and that Claims 26 - 31 are patentable at least per the patentability of independent Claim 25.

CONCLUSION

In light of the above amendments and remarks, Applicants respectfully submit that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,

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Amelia Tauchen